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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,281	08/02/2001	Radislav Alexandrovich Potyrailo	RD-26,350	5671

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

SIEFKE, SAMUEL P

ART UNIT PAPER NUMBER

1743

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/920,281	<b>Applicant(s)</b> POTYRAILO ET AL.	
	<b>Examiner</b> Samuel P. Siefke	<b>Art Unit</b> 1743	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 and 22-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 and 22-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "at least one reagent that is capable of undergoing a selective chemical interaction with said first chemical species to be detected to yield at least one optically detectable interaction product, said optically detectable interaction product comprising a second chemical species." A second chemical species is not discussed in the instant applications specification in a manner where the optically detectable interaction product comprises a second chemical species. The only mention in the specification paragraph 35 of second chemical species to be detected is "More than one opto-acoustic wave sensing element or sensor, each having a different coating and reagent, may be dropped into the same well for the detection of different chemical species that are likely to be in the well." There is no mention of a second chemical species arising from an optically detectable interaction product. The Examiner understands what the applicant is trying to claim but suggests

rewording claim 1 to more of the information provided in the specification. Even then the prior art still teaches each and every limitation.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-4,6-9,17-20,22-26** are rejected under 35 U.S.C. 102(b) as being anticipated by Furuki et al. (USPN 5,411,709).

Furuki discloses a gas detector for simultaneously detecting a kind of gas to be detected and a gas concentration by simultaneously effecting adsorption measuring type gas detection and optical gas detection. The gas detecting element comprising a gas sensitive thin film disposed on a piezoelectric vibrating element (SAW) and adapted to generate fluorescence or phosphorescence upon chemical interaction (electronic interaction) with the gas of interest and irradiated with a light. The dye (reagent) interacts with a first chemical species (gas of interest) to yield at least one optically detectable interaction product (the fluorescence). The second chemical species would be the fluorescence produced by the chemical interaction of the gas with the dye. A gas of interest is reduced or oxidized by chemical interaction with the dye which produces a

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product with a second chemical species which gives rise to the fluorescent detection.

The element further comprises a light receiving element for receiving the fluorescence generated from the gas sensitive thin film and adapted to detect the intensity of the fluorescence. The wave-sensing element (SAW) comprises two electrodes coupled to the wave element (col. 10, lines 51-56); a coating being disposed on the entire wave element (col. 10, lines 54-59, fig.4, col. 11, lines 6-17); a source of EM radiation optically coupled to the wave sensing element, the radiation is modified by the interaction with the gas sensitive thin film which produces a modified EM radiation which can be matched to identify a product (col. 6, lines 38- col. 7, line 56); a first detector for detecting a change in a wave sensing element (mass ;col. 6, lines 9-37, col. 11, lines 39-68); a second detector for detecting an optical property (col. 6, lines 38- col. 7, line 56). Furuki discloses any oscillator circuit having piezoelectric vibrating element a transistor circuit, a TTL circuit, a C-MOS circuit or the like similar to those used for ordinary usages can be used (QCM, TSM). Furuki discloses a gas sensitive thin film layer has a property of adsorbing a gas to be detected, such as oxidizing and reducing gases include NO<sub>x</sub>, SO<sub>x</sub>, C<sub>2</sub>, O<sub>3</sub>, CO<sub>2</sub>, CO an organic acids NH<sub>3</sub>, H<sub>2</sub>S an organic amine and the like, organic solvent gases including various alcohols, acetone, chloroform, tetrachloroethylene, hexane, benzene, toluene, and the like, perfumes of such as ester, anesthetics and so on. It is inherent that the thin layer be porous because gases are adsorbed onto and into the thin layer.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **5,10-16, 31-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuki et al. (USPN 5,411,709) in view of Ebersole et al. (USPN 5,756,279).

Furuki discloses a gas detector for simultaneously detecting a kind of gas to be detected and a gas concentration by simultaneously effecting adsorption measuring type gas detection and optical gas detection as described above.

Furuki does not teach specific polymeric materials that the gas sensitive thin film layer is made of, or the thickness of the thin film.

Ebersole discloses an optical acoustic wave sensor for detecting an analyte in a liquid sample. The sensor comprises an optical acoustic wave sensing element

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(QCM,SH-APM, piezoelectric oscillator SAW, waveguide, col. 6, lines 59-67, col. 9, lines 5-14) having two electrodes coupled to an acoustic wave element (col. 8, lines 48-61); a coating (poly(methyl methacrylate) col. 11, lines 18) being disposed on the acoustic wave element which undergoes a chemical interaction with chemical species to be detected to yield an optically detectable interaction product (col. 9, lines 17-50, col. 14, line 61- col. 15, line 30); a source of electromagnetic radiation optically coupled to the acoustic wave sensing element (col. 9, lines 32-50); a first detector for detecting a change (mass, viscoelastic col. 4, lines 27-39; col. 4, lines 59-61) in a property of the optical acoustic wave sensing element (col. 8, lines 48-67); a second detector for detecting an optical property of the interaction product (col. 9, lines 32-50); the QCM is an AT-cut and a BT-cut quartz crystal (col. 7, lines 4-7); the polymeric coating has a thickness between 10 nm and 100 micrometers (col. 4, lines 1-5; col. 9, lines 60-67); the optical waveguide is an optical fiber (col. 3, lines 9-19). It would have been obvious one of ordinary skill in the art to modify Furuki to include the polymeric material and thickness of Ebersole because it is known in the art that porous polymeric materials of Ebersole are used in SAW sensor to detect along with the thickness of the film layer.

Claims **26-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuki et al. (USPN 5,411,709) in view of Ebersole et al. (USPN 5,756,279) as applied to claims **5,10-16** above, and further in view of Friedman (USPN 5,547,877).

Furuki discloses an optical acoustic wave sensor for detecting an analyte in a gas sample.

Furuki does not teach detecting chemicals in the group consisting of halogenated hydrocarbons such as TCE trichlorethane and trihalomethanes.

Friedman teaches detecting halogenated hydrocarbons which react with pyridine or alkyl-substituted compounds of pyridine to yield colored products in the presence of a strong base. Colored reaction products of chloroform, bromodichloromethane, chlorodibromomethane, bromoform and TCE strongly absorb at wavelengths of 538-540nm. Therefore it would have been obvious to one having an ordinary skill in the art to modify Ebersole to use a polymeric layer that contains a pyridine or alkyl-substituted compound because of the specific reaction with halogenated hydrocarbons which produce a colored product.

### ***Response to Arguments***

Applicant's arguments filed 6/23/05 have been fully considered but they are not persuasive. Applicant argues, "The optically detectable interaction product comprises a second chemical species." As stated above "The dye (reagent) interacts with a first chemical species (gas of interest) to yield at least one optically detectable interaction product (the fluorescence). The second chemical species would be the fluorescence produced by the chemical interaction of the gas with the dye. A gas of interest is reduced or oxidized by chemical interaction with the dye which produces a product with a second chemical species which gives rise to the fluorescent detection."

Below are arguments presented in the Final Office action dated 2/23/05.



Applicant argues, "Furuki does disclose at least one reagent capable of undergoing a chemical interaction with the chemical species to be detected to form an optically detectable interaction product." The Examiner would like to point to col. 5, lines 25-29. "The gas sensitive thin film should be desirably such that gas molecules adsorbed cause an electronic interaction with the dye molecules in the thin film, and the intensity of fluorescence or phosphorescence changes reversibly." This specifically states that gas interacts with the dye molecules in the film to produce a fluorescence or phosphorescence that can be detected.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "The interaction product, which only comes into existence in the film when the gas to be detected interacts with the reagent, modifies the incoming EM radiation by either absorbing EM radiation from the EM radiation source or emitting a different radiation) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### ***Conclusion***

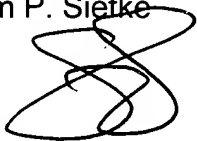
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel P. Siefke whose telephone number is 571-272-1262. The examiner can normally be reached on M-F 7:00am-5:00pm.

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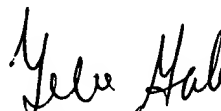
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam P. Siefke



August 31, 2005

  
**YELENA GAKH**  
**PRIMARY EXAMINER**